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Priority Date(s): ...
Complete Specification Filed: ...
Class: ...
Publication Date: 21 DEC 1989
P.O. Journal, No: ...

NEW ZEALAND

PATENTS ACT, 1953

No.:

Date:

COMPLETE SPECIFICATION

BUILDING SYSTEM

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hereby declare the invention for which I / ~~we~~ pray that a patent may be granted to me/~~us~~, and the method by which it is to be performed, to be particularly described in and by the following statement:-

(followed by page 1a)

This system has been designed to facilitate the construction of buildings, walls, cross walls and the like without the need of special equipment or technics. The essential idea is to provide a basic interbonding system using three types of blocks. The blocks are designed to firmly lock together and thus the construction does not require the traditional mortar or cement to bond it together. Due to the selection and position of the protruding ears and of the grooves that fit on said protruding ears, it is possible to interlock said blocks in parallel, in cross-section or in any other desired arrangement or combination. Thus, with this system any simple or complex structure may be built.

The state of the art is still complex and costly and is far behind the invention herein described because either too many differently shaped blocks must be used in combination and/or because manufacturing, stocking, selecting and assemblying so great a number of blocks defeats the idea of faciliting construction. Also, such complications increase costs and require skilled personnel to allot the type of blocks that will be used in a particular building. Workmen certainly need some skills to control inventaries and select the proper blocks as may be needed. For example, Canadian patent 1,142,773 relates to a fitting block comprising a distinctive manner of obtaining male-female fitting of blocks intended to form the moldings for beams or doorheads with pillars going through them, or to form groups or channels for internal line or cable ducts. This system does not require skilled workmen. However, it needs special machinery for its manufacture. It also requires many forms of blocks to obtain building configurations such as corner, columns, cross-walls, etc.

The object ot the invention is to provide three basic blocks with which any desired structure can be built.

Another object is to obtain a construction system which does not require special equipment or skilled workmen.

A further object is to provide the means for precision molding of blocks.

Another object is to use as few molds as possible to reduce manufacturing costs.

Another object is providing blocks which may be easily cubed for transportation and stocking.

Another object is to make it easy for the builder to choose acquire and use the blocks.

IN THE DRAWINGS:

Figure 1 is a perspective top and bottom view of a group of full blocks.

Figure 2 is a top plant view of the half-block.

Figure 3 is a cross-section view of figure 2 at lines III-III.

Figure 4 is a top plant view of the full block.

Figure 5 is a cross-section view of figure 4 at lines V-V.

Figure 6 is a cross-section view of figure 4 at lines VI-VI.

Figure 7 is a top plant view of the knock-out block.

Figure 8 is a cross-section view of figure 7 at lines VIII-VIII.

Figure 9 is a cross-section view of figure 7 at lines IX-IX.

Figure 10 is a cross-section view of figure 7 at lines X-X.

Figure 11 is a top plant view of the shoe assembly 1 of the block molding.

Figure 12 is a cross-section of figure 11 at lines XII-XII.

Figure 13 is a cross-section of figure 11 at lines XIII-XIII.

Figure 14 is a plant view which shows a particular configuration of interbonded blocks.

Figure 15 shows the parallel and side by side block interbonding.

Figure 16 (a) to (i) show some of the many possible configurations obtained by combining and interbonding the full block, the half block and the knock-out block.

DETAILED DESCRIPTION

The system comprises the combination of three basic building blocks. The full block, the half-block, and the knock-out block.

These blocks should be manufactured with precision for interbonding there between without the use of mortar. Load-bearing structures can be built therewith.

THE FULL BLOCK

1) All measurements between groove face 100, and face 102 and side face 101 are the same and any combination of two grooves should be less than the distance between ears 107 AB and 107 AC.

2) The measurements between the tapered groove faces 106 must be greater than the sides of ears 107 BB or 107 CC.

3) The tapered groove 106 is larger at the bottom face 109 than at the top face 108. This makes for an adequate locating device when in contact with the ears 107 AB or 107 AC.

4) The center webs 103 are placed in critical positions that ensure the exact location for the protruding ears 107 AB and 107 AC. That makes the ultra block system so versatile.

It is desirable that face of ear 104 protrudes in a 1/5 to 1/25 rate the distance between the bottom face 109 of the block and top face of the block in relation to said face 108.

THE HALF BLOCK

The half block is exactly half the size of the full block and it can be incorporated into the system in any combination. The groove 200 in any face 201 will slide down the ear 107 AB or 107 AC of the full ultra block and any

combination of end or side faces of any proceeding block, full, half or lintel.

The main function of the half block is to give any wall built with this system a straight end wall finish when using the running bond method of construction.

The characteristics of the half block are the greater cavity and the four internal recesses in the four internal block walls. Figure 2 illustrates it has no protruding ears. Nevertheless, it fits in the bonding with the basic block.

THE LINTEL OR KNOCK-OUT BLOCK

The main functions of the lintel or knock-out block are two fold:

1) With the single web 306 located in the center of the block it allows for a greater opening in the block. The distance between the center web 306 A or B and the groove 304 in the end face 301, provides greater accessibility to cavity A for housing water lines, electric cables, etc. Also, concrete or insulating materials may be poured into the cavities.

2) Placed in the end faces 301 and two slots 307 that extend approximately 1/3 depth into the end faces 301, placed in the center web 306 are two continuous slots 308 that extend approximately 1/3 depth into the center web 306. When given a sharp blow with a hammer these parts will

knock-out giving access for reinforcing bar (steel) and concrete to be placed in the blocks to create beams, and lintels.

The block is designed to fit into this system. Internal interlock is as per the full and half blocks.

TYPICAL INTERLOCKING METHOD FOR RUNNING BOND STRAIGHT WALL AND CORNER

Any combination of faces 102 on blocks A and B are placed in line and closed together, any combination of faces 101 on block C is placed closed together with the end face 102 on block B and so placed that face 102 on block C is in line with faces 101 on blocks A and B.

Block D is placed on blocks A and B in a central position, the groove 100 located on both end faces 102 of block D will slide down the ear 107 AC on block A and the ear 107 AB on block B. The tapared grooves sides 106 on face 102 block D being larger than sides of the ear 107 AC block A and the ear 107 AB on block B, and the distance between the grooves 100 on the faces 102 on block D being greater than the distance between the ear 107 AC on block A and the ear 107 AB on block B when the end face 102 of block A is in contact with the end face 102 of block B. D block is in positions when the bottom face 109 of block D is in contact with the top face 108 of block A and the top face 108 of block B.

Block E is placed on blocks B and C in a central

position to groove 100 in the end face 102, the blocks will slip down the ear 107 AC of block B, the distance between the ears 107 AB and 107 AC being greater than the distance between the groove 100 face 102 block E when the two end faces 102 make contact.

MOLD DESIGN

In the conventional manufacture of conventional blocks only one bar 400B is used for the cores. Said core bar is located along the top face of a mold for concrete blocks which support steel cores 401B to form a cavity or hollow in a concrete block. This causes a problem to the block manufacturer because the area just below the core bar, wherever a 403B block face exists, cannot be compressed by the top face of the forming press 404B, this is solved by severing and removing a small section in the lower portion of the core bar located on the top face of the concrete block to obtain a thin area. This results in a small amount of loose concrete that is left on the top face 402B of the block, in the conventional process, when the concrete block is removed from the mold. Said loose concrete can now be removed using pressurized air streams or rotating brushes placed in the appropiate location on the block once it has been removed from the mold. Now then, with regard to the novel block and mold herein described, the central position of the protruding earse in the base block means that variations should be introduced

in the process. The first variation is due to the fact that pressurized air currents cannot be used without damaging the integrity of the protruding ears when a single core bar, instead of the twin bars used in this process, is used. The second problem is that for forming the protruding ears a molding press having the exact form of the protruding ears for the formation thereof is used, and this solution malforms the resulting molded ear due to a suction effect ocurring at the time of removing the mold once the ear is formed. The suction effect also causes the mold to retain some of the concrete which should have stayed on the ear. In other words, the compression shoes get dirty and have to be cleaned in every block formation cycle. For solving this problem the mold herein described is designed for using the twin core bars 400A supporting steel cores 401A. The positions of the twin bars 400A can be approximately 6 mm from the external edge 402A of the protruding ear to a position of approximately 3 mm with relation to the external edge of the steel core.

The section of twin bars in the area 403A extends downwards between steel cores 401A to the firts level defined by top face 404A of said block.

In the 6 mm space located between the two 400A twin bars and side face of molding 408A and delimited also by steel cores 401A a molding guide 407A which is removable is used.

The above allows the material to be deposited on the 402A area during the pouring cycle and, consequently, the

piston 406A of the central compression shoe press 400A can be shorter than pistons 405A of molding press in a rate of, for instance, the height of the ear which varies between 1/15 and 1/25 the distance between the top and bottom face of the basic block. Central molding press 410A is now a flat face molding which facilitates the same to be removed when the block is removed from the mold. Also the flat face of the central compression shoe makes it easy to clean because conventional methods can be used for this purpose.

The use of twin bars 400A gives place to the use of conventional measures for cleaning the loose concrete deposited on the block face without damaging the protruding ears as mentioned before. Another further benefit of the use of twin bars is that during the pouring cycle, the area between parallel bars can be isolated from the external areas of said twin bars, thus allowing the deposition of greater amounts of material in the area comprised between bars 402A, if necessary.

The method of depositing the additional material in the area comprised between the twin bars is used by setting the height of the material strike off plate in the area disposed between the core bars. The adjustment of the height will depend on the type of mixture used as well as on the materials conforming said mixture.

Figure 10 shows the special machinery necessary to manufacture concrete blocks. The configuration shown would be very expensive for production, for it requires a special machinery as well as a minimum of additional elements for

supporting the block in its humid state. Also, as this is used with systems of interbonded blocks consisting of 10, 20 or 30 base molds, against only 3 molds of this invention, the production of the conventional equipment is more expensive and less versatile.

What I claim is:

1. A building structure comprising a set of three types of interlocking cavity blocks, said three types of blocks comprising:

a. a full block of rectangular configuration comprising: two spaced, parallel end walls and two spaced, parallel side walls extending longitudinally of said block between said end walls, said end and side walls having respective external and internal faces; two middle webs extending transversely of said block and parallel to said end walls between internal faces of said side walls and with said end walls defining two end cavities of substantially equal size and a central cavity, each said cavity being open-ended and extending between top and bottom faces of said block; an ear on a central portion of each said middle web protruding upwardly between outer portions of said middle web and defining opposed pairs of transverse and longitudinal ear surfaces, parallel to the block side and end walls and which extend to a top ear surface, each said ear having substantially the same dimensions; and a groove in said internal face of said end wall and each of said side walls of each said end cavity, each said groove extending from said bottom face to said top face, each said groove in said internal face of said end and side walls being defined by a planar base and

adjacent opposite side edges, said side edges of said groove in each said end wall being spaced from said respective proximal external face of said side wall so as to align with the longitudinal ear surfaces, and said transverse ear surfaces adjacent said central cavity being spaced from said external face of the respective proximal end wall a distance substantially one-half the external length of the full block minus the distance from said base of said groove in the said proximal end wall to said external face of said end wall; and said side edge proximal said end wall of each said groove in each said side wall being substantially the same distance from said external face of said proximal end wall as the distance from each said longitudinal ear surface of each said ear to said external face of said proximal side wall, whereby an ear and groove of adjacent blocks can be male-female interlocked with one external face of one block flush with an external face of said adjacent block;

b. a half block of rectangular configuration comprising four walls, each wall having an external face and an internal face, said internal faces defining an open-ended internal cavity extending between top and bottom faces of said block, each wall of said half block having the same size and groove configuration as said end walls of said full block whereby said half block is half

the length of said full block and is adapted for male-female fitting with one said ear of one of said full blocks; and

c. a knock-out block of rectangular configuration comprising exterior walls with the same size external end faces and side faces and with the same groove configurations relative thereto as said full block; a central web extending transversely of said block and parallel to said end walls between internal faces of said side walls defining a pair of open-ended internal cavities extending between top and bottom faces of said block, and wherein slots are provided in portions of the end walls and the central web to facilitate the removal of frangible portions thereof, the frangible portions, when removed, permit insertion of reinforcement bars across and between more than one of said knock-out blocks;

wherein said blocks are stacked on top of each other with the ears of said full blocks being engaged within the grooves of superposed full blocks, half blocks or knock-out blocks.

2. A building structure according to claim 1, wherein the stacking of a plurality of the full blocks, the half blocks and the knock-out blocks defines a mechanical and self-locking bonding which does not require mortar to hold the resulting structure against movement.

3. A building structure according to claim 1, wherein a plurality of said half blocks are stacked one upon another to define at least one cavity wherein reinforcing rods and concrete are placed which forms at least one column or the like.

4. A building structure according to claim 1, wherein a plurality of said knock-out blocks are stacked one upon another to define at least one cavity wherein reinforcing rods and concrete are placed which forms at least one column or the like.

5. A building structure according to any one of claims 1 to 4, wherein the alignment of the cavities of combinations of the three types of blocks allows the disposition of piping and cables inside the cavities.

6. A building structure according to any one of the preceding claims, wherein the blocks are interlocked in parallel, crossed, piled up or running bond patterns to obtain a desired form and dimension.

7. A building structure according to any one of the preceding claims, wherein the blocks form a load bearing structure.

8. A method of producing the full block as defined within claim 1, comprising: supporting forming cores, which define said central cavity and each of said grooved end cavities, in a hollow mold with twin core support bars for the duration of molding said block from cementitious material, said mold defining the bottom and exterior side and end wall faces of said block, said twin core bars including molding guides which extend downward therefrom to the top face of said full block and define the longitudinal ear surfaces of each of said ears; inserting said cementitious material into said mold and compressing said material between said guides and said cores with a downwardly movable central compression shoe press piston in said mold, whereby to form said ears on said central portions of said middle webs of said full block; and separately compressing said material at said outer portions of said middle webs on the outer sides of said twin core bars from said central compression shoe press piston and said material at the top surface of the end walls between said twin core bars with corresponding compression shoe press pistons separate from and downwardly longer than said central compression shoe press piston whereby to form the top surface of said outer portions of said middle webs and the top surface of the side and end walls.

9. A method according to claim 8, including vibrating the mold once it has been filled with the cementitious material.

10. A method according to claim 8, including removing surplus cementitious material with a rotating brush.

11. A building structure substantially as herein described with reference to the accompanying drawings.

12. A method for producing the full block substantially as herein described wtih reference to figures 11-13 of the accompanying drawings.

Terance Joseph Hunt
[illegible] Agents,
A. J. [illegible] & Son
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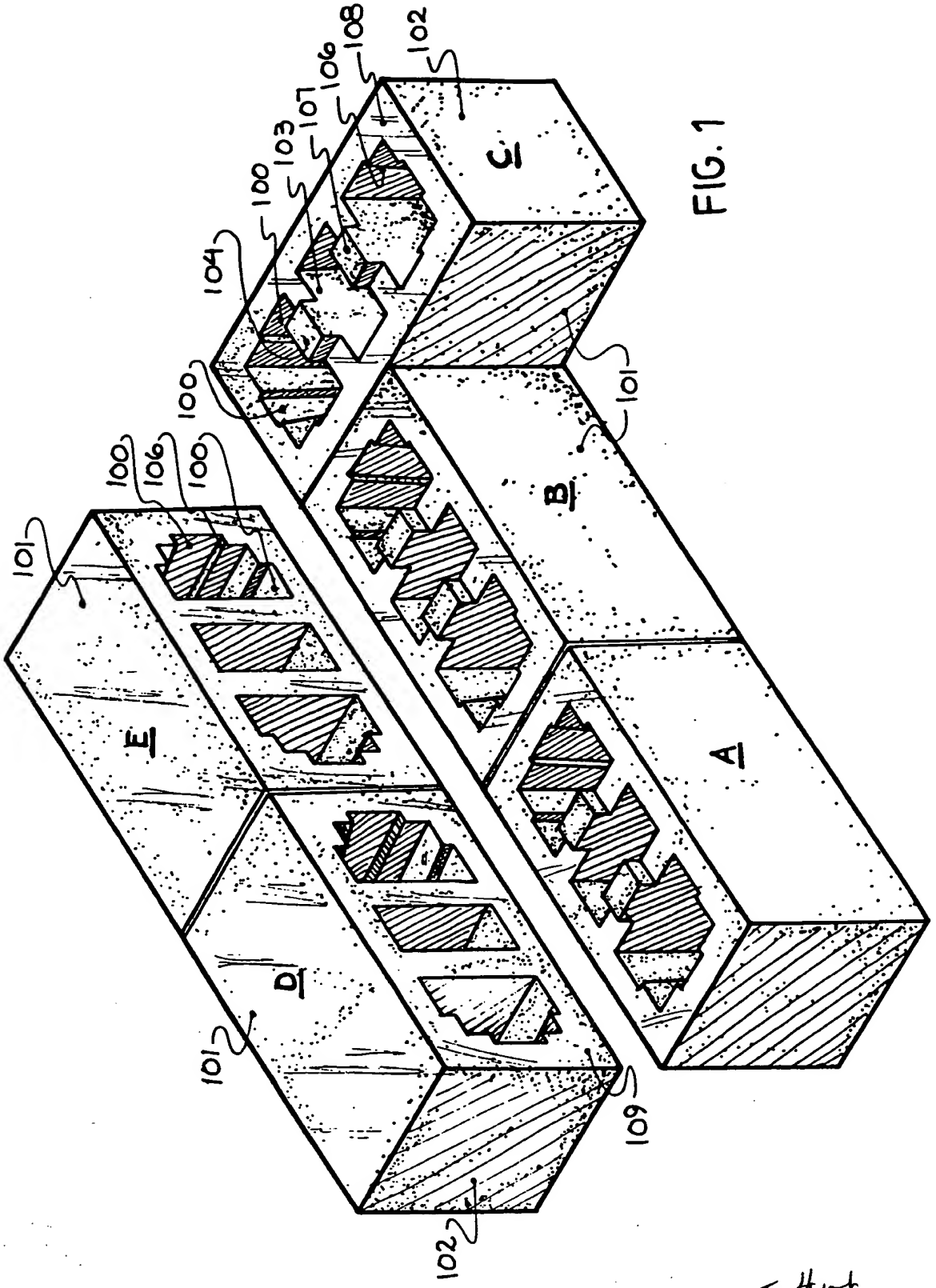

FIG. 1

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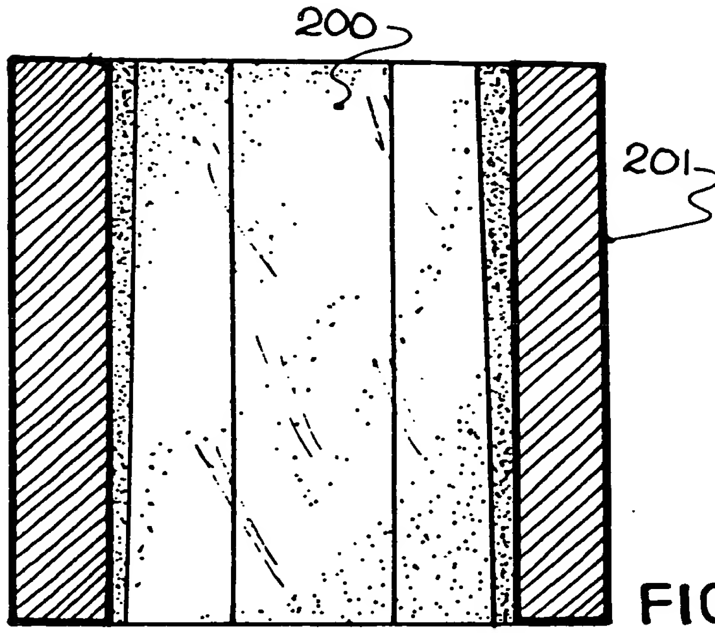

FIG. 3

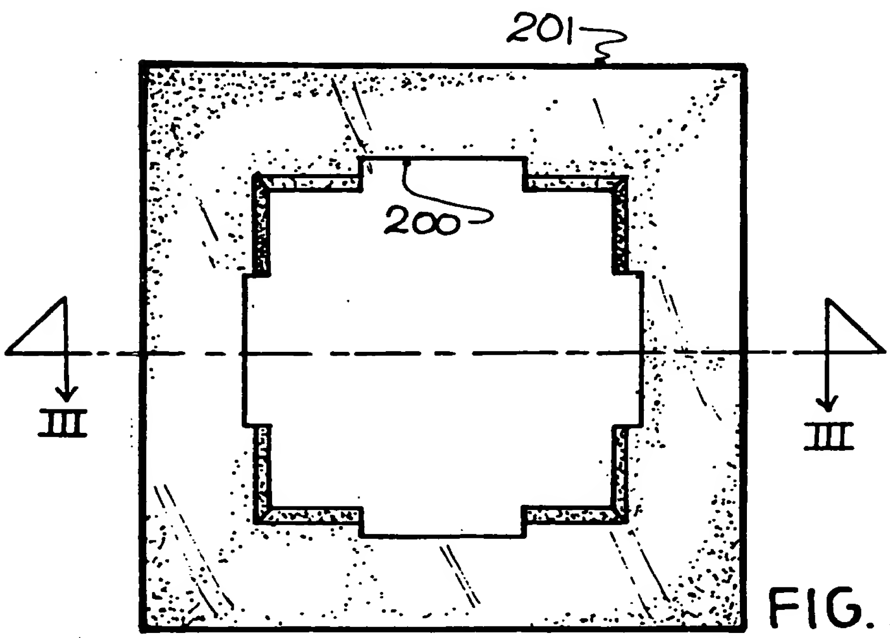

FIG. 2

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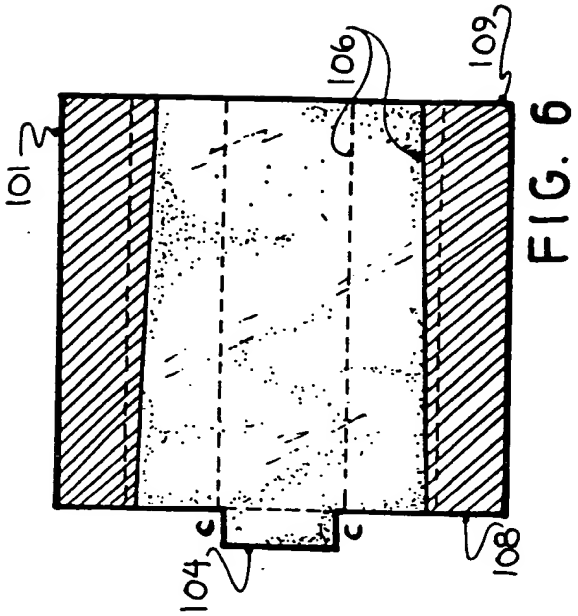

FIG. 6

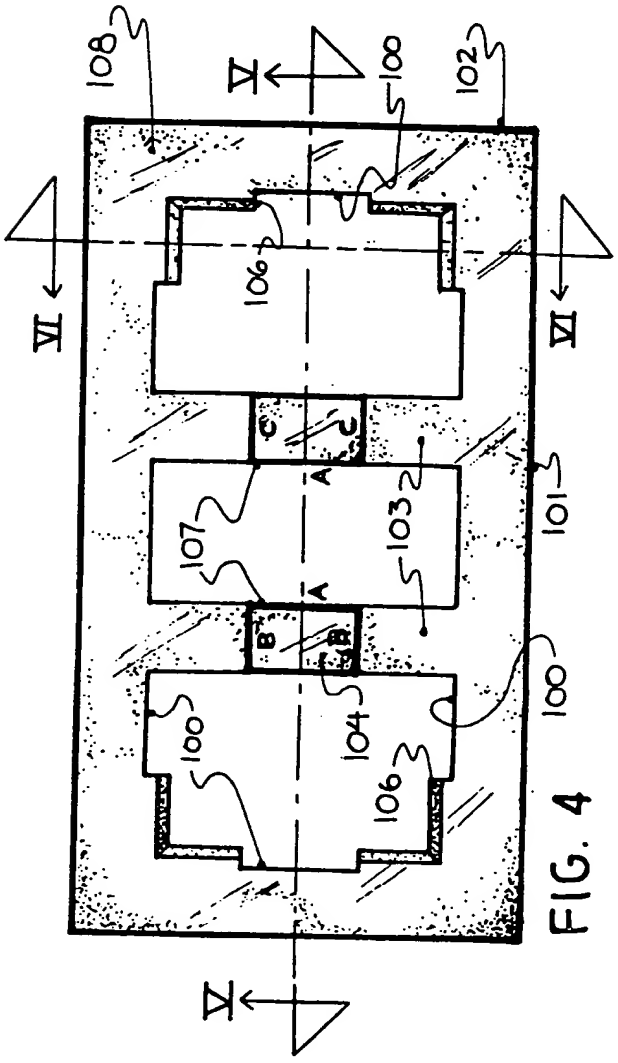

FIG. 4

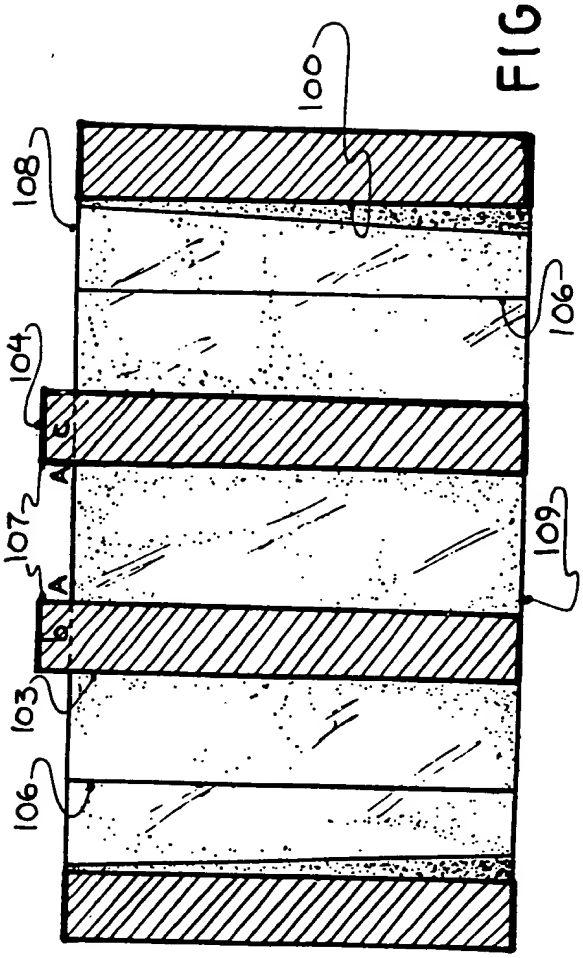

FIG. 5

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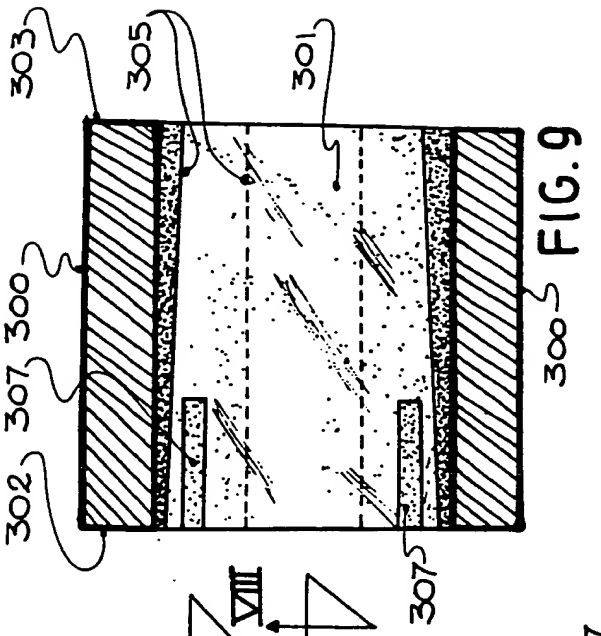

FIG. 9

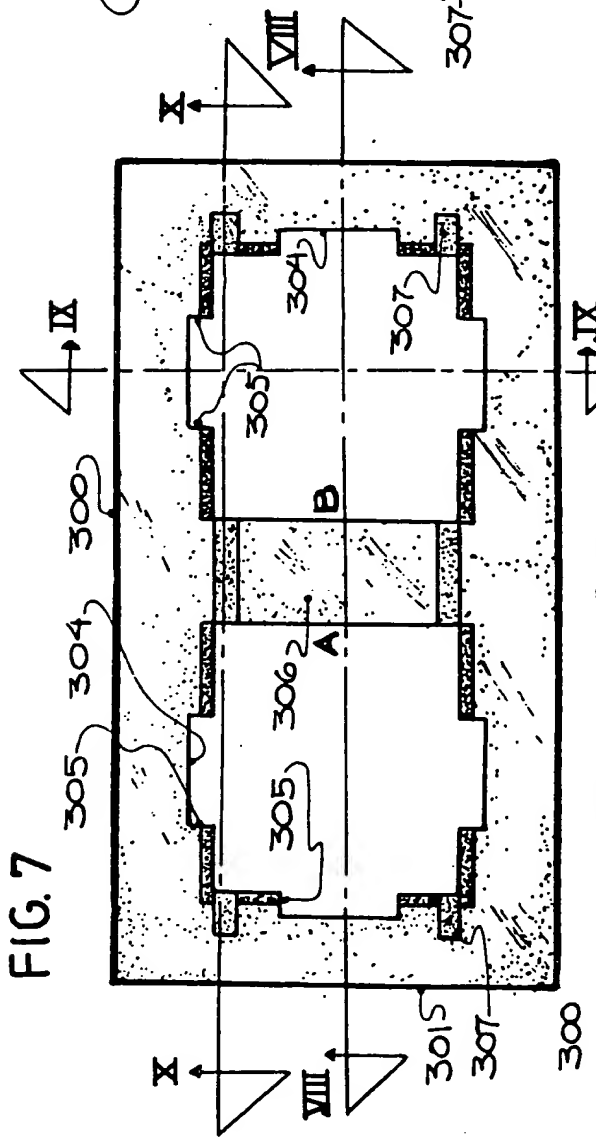

FIG. 7

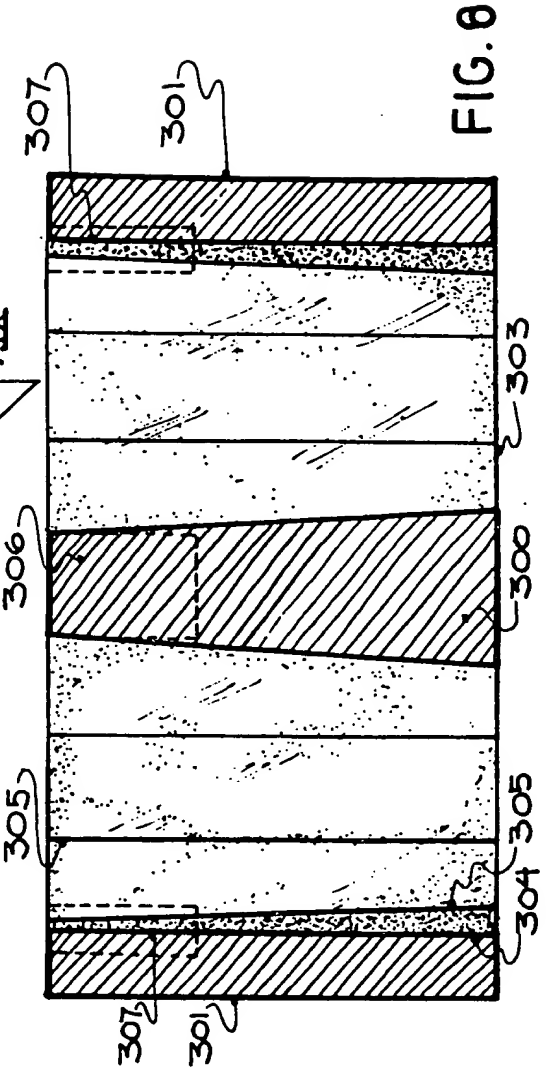

FIG. 8

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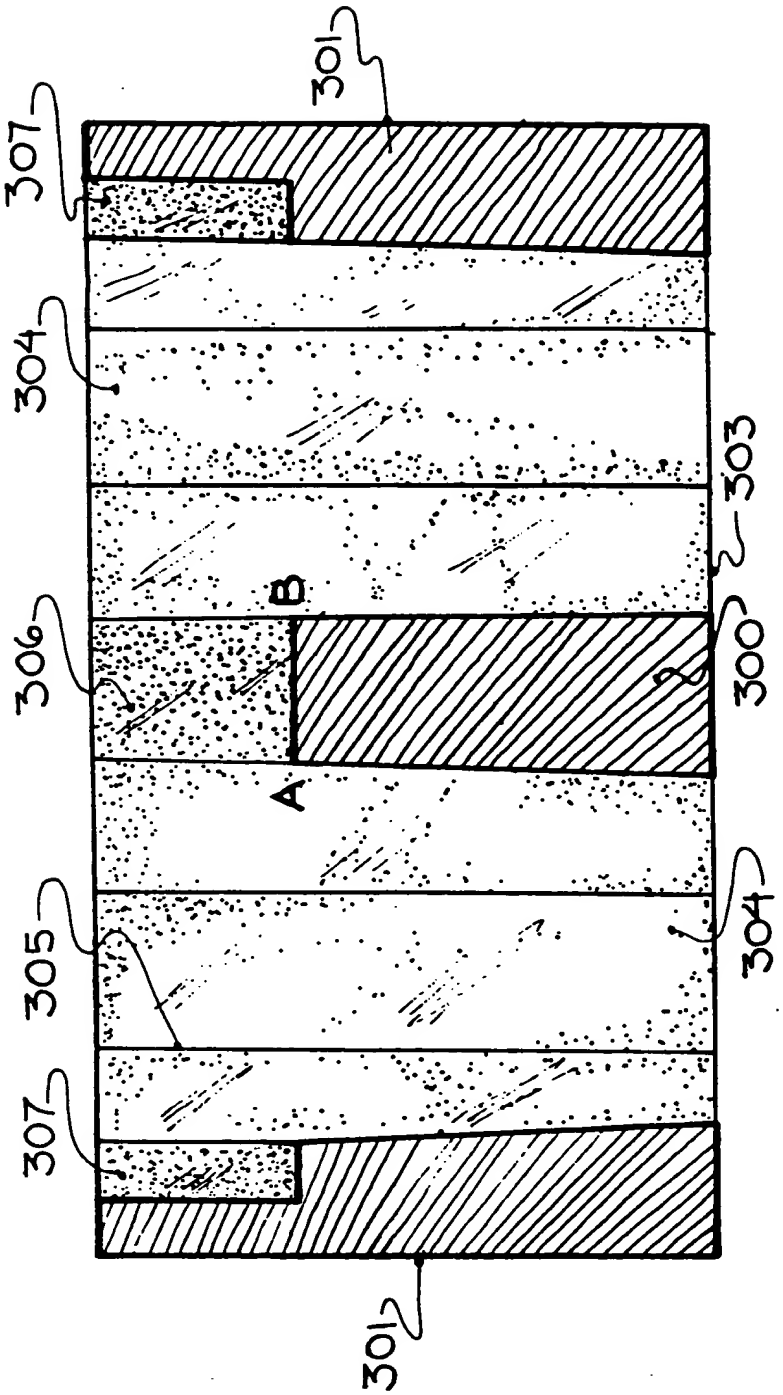
FIG. 10



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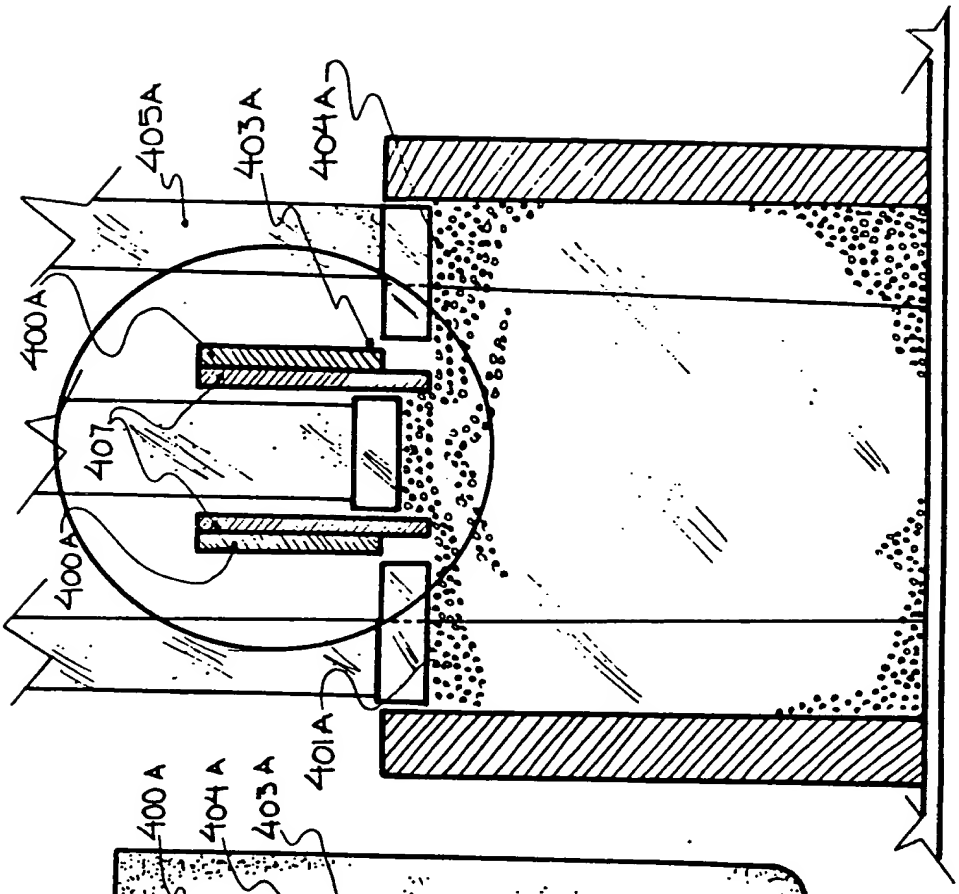

FIG.12

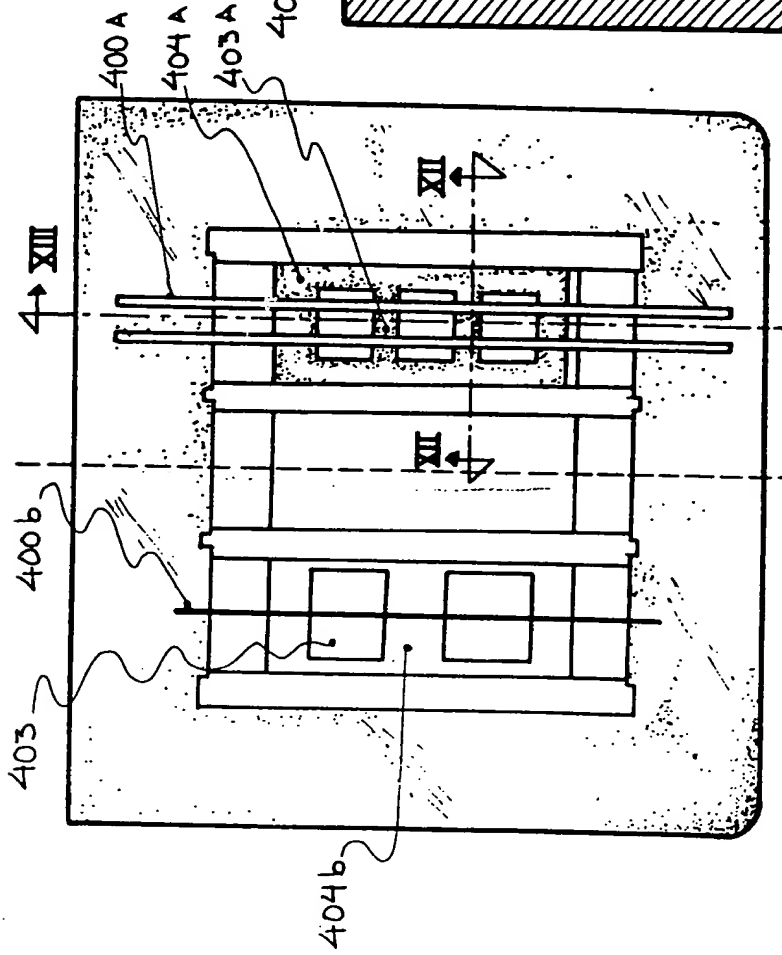

FIG.11 b|a

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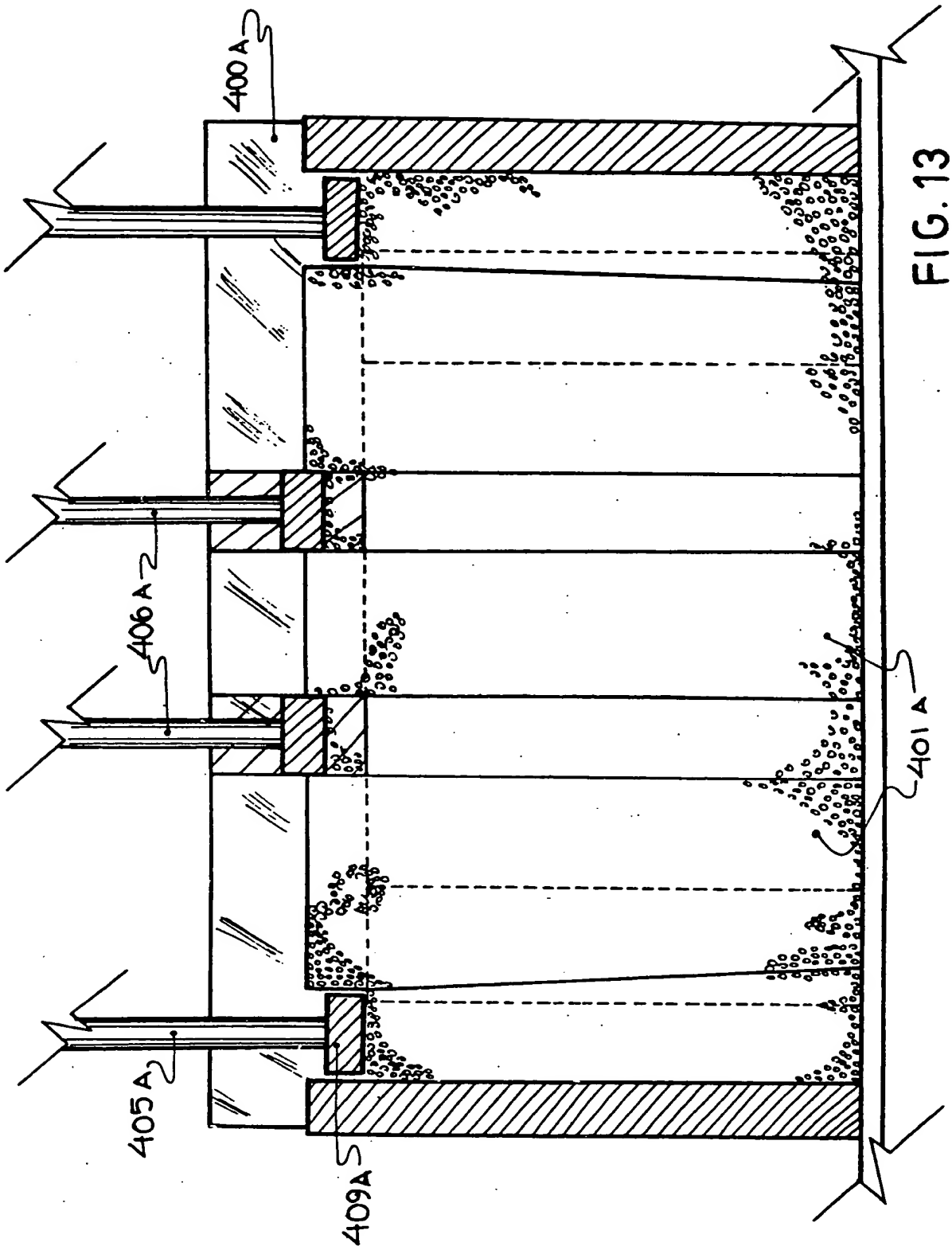

FIG. 13

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FIG. 14

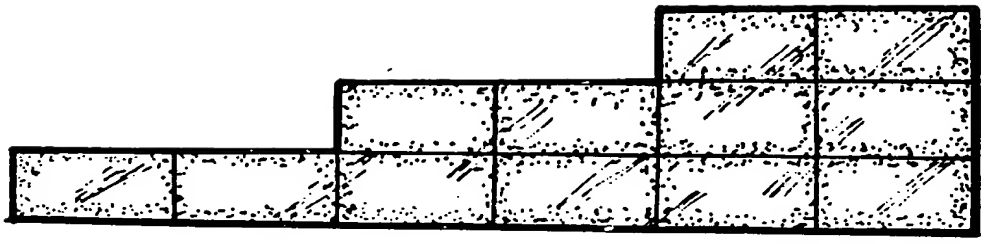

FIG. 15

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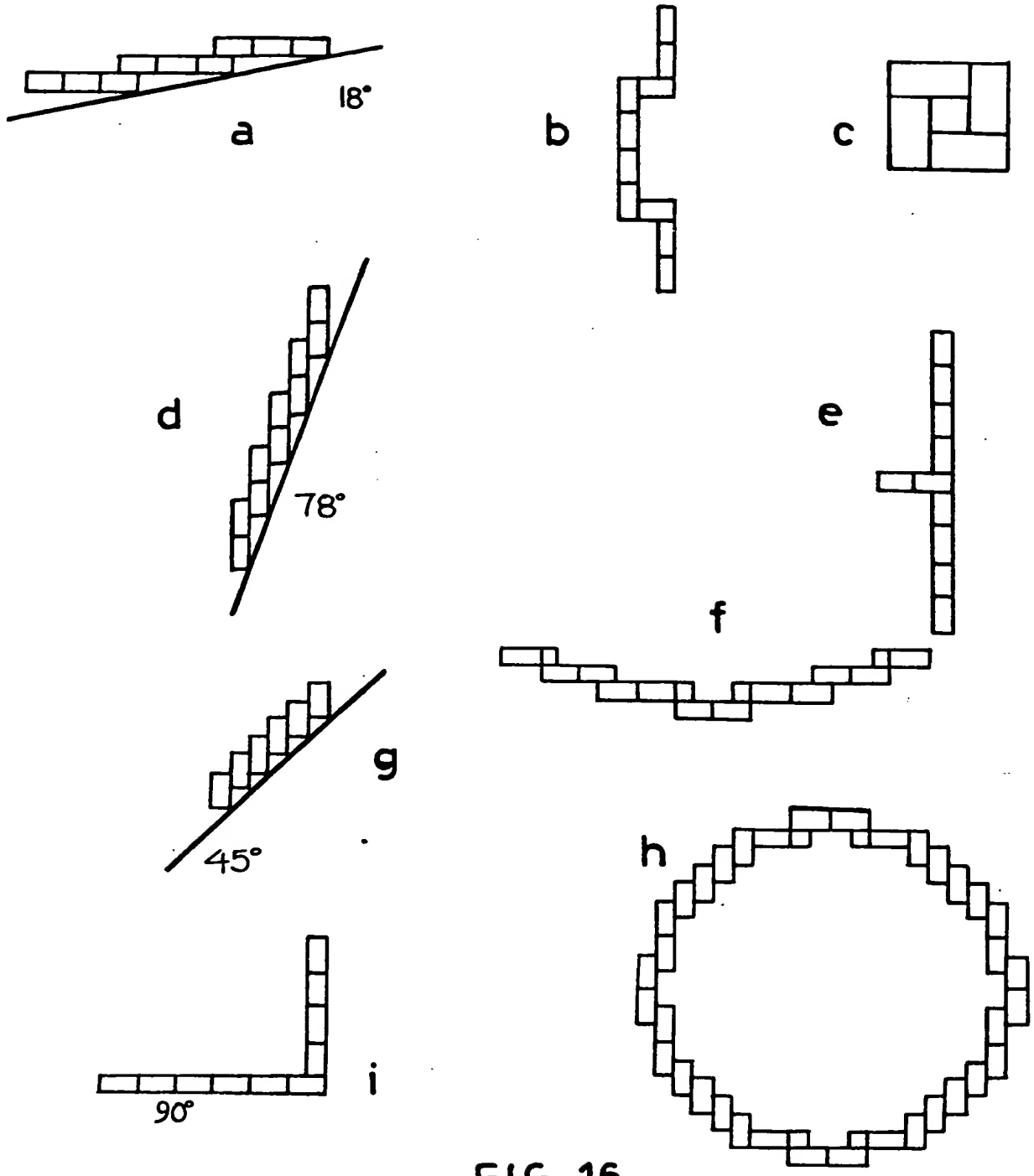

FIG. 16

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